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AUTHOR Ferreira, Maria M.
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ABSTRACT

The nature of the relationship between graduate student and advisor is perhaps the most important determinant of a student's success or failure in any graduate program. This relationship is even more important in science where in addition to being the student's advisor and mentor, the advisor is usually the head of the laboratory in which the student conducts research. The purpose of this study was to investigate graduate students' perceptions of the level of mentoring in two graduate science departments, their relationships with their advisors, and the characteristics of an ideal advisor. Results indicate that the level of mentoring in each department was not very high. This view was particularly common among female students in chemistry. (Contains 14 references.) (CCM)

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THE IDEAL ADVISOR: GRADUATE SCIENCE STUDENTS' PERSPECTIVES

Maria M. Ferreira, Wayne State University

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Introduction

The nature of the relationship between the graduate student and his/her advisor is perhaps the most important determinant of a student's success or failure in any graduate program (Bargar & Mayo-Chamberlain, 1983). This relationship is even more important in science where in addition to being the student's advisor and mentor, the advisor is usually the head of the laboratory in which the student conducts her/his research. Sheila Widnall (1988) points out that because the Ph.D. thesis in science is primarily an apprenticeship in research, a graduate student's success greatly depends on the nature of the relationship with her/his advisor. According to her "the advisor is the primary gatekeeper for the professional self-esteem of the student (p.1743)." Advisors are also the most readily accessible professional role models to their graduate students.

Conceptual and Empirical Foundations of the Study

Research indicates that the nature of the relationship between graduate students and their advisors is the single most important factor in the success of graduate students. Studies show that students' satisfaction with doctoral programs is directly related to satisfaction with advisement relationships (Carter, 1983; Daniels-Nelson, 1983). In fact, the quality of the interpersonal relationships between graduate students and their advisors has been found to be a better predictor of success in a doctoral program than a student's GRE scores and undergraduate grade point average (Sorenson & Kagan, 1967). Unfortunately, the advisor-advisee relationship is often perceived as the most disappointing aspect of many students' experiences in graduate school (Bargar & Mayo-Chamberlain, 1983; Carter, 1983).

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According to Winston, Miller, Ender, and Grites (1984), the graduate advisor performs a minimum of five essential roles: a) being a reliable information source, b) acting as a departmental socializer, c) acting as an occupational socializer, d) serving as a role model, and e) being an advocate for the advisee. Furthermore, it is essential that advisors of incoming graduate students take the initiative in establishing sound interpersonal communication grounded on trust, openness, and mutual willingness to grow (Bargar & Mayo-Chamberlin, 1983).

Ideally, advisors become true mentors to their students. According to Anderson and Shannon (1988), mentoring is an intentional, insightful, supportive process "in which a more skilled or more experienced person, serving as a role model, nurtures, befriends, teaches, sponsors, encourages, and counsels a less skilled or less experienced person for the purpose of promoting the latter's professional and/or personal development (p. 39)." Furthermore, the mentoring process involves three stages: "modeling," "coaching," and "fading." The mentor "models" by revealing his/her problem-solving strategies; "coaches," by supporting the students' attempts to perform new tasks; and "fades" after having empowered the students to work independently (Brown, Collins, & Duguid, 1989).

Students who have a mentoring relationship with their advisors feel professionally affirmed and are more productive after graduation (Heinrich, 1991; Subotnik & Arnold, 1995). Research indicates that successful scientists often have had, at some stage of their career, supporting and influential mentors (Subotnik & Arnold, 1995). Female students who join science graduate programs with few or no female faculty are at a greater risk of leaving a promising career in science when their advisors show little interest in their success. Subotnik & Arnold (1995) argue that women, in particular, who may question their ability to be successful, do best in colleges and universities that offer responsive mentors.

According to Walter C. Randall (1982), the ideal advisor/mentor advises his students to the best of his ability and wants to make them as good or better than he is and as quickly as possible. In addition, an ideal advisor/mentor allows his students to make mistakes and while pointing out their oversights, admits and shares his own past mistakes with them. Advisors who

have mentoring relationships with their students use an "androgynous" approach and are "gender-sensitive." These advisors assume "father-daughter/son" and "colleague-colleague" roles with their advisees (Heinrich, 1991).

This purpose of this study was to investigate graduate students' perceptions of: the level of mentoring in two graduate science departments, their relationship with their advisor, and the characteristics of an "ideal advisor."

Methods

The study took place in two graduate science departments, biology and chemistry, at a large research university. Quantitative and qualitative methodologies were used in data collection and analyses. Results were based on a 5 point Likert-type scale survey questionnaire from 170 students (71 females and 99 males) and interviews conducted with 32 students (16 females and 16 males). Six of the students interviewed had left the program before completing their degree. The survey items examined students' perceptions of their relationship with their advisors as well as students' perception of the level of mentoring in their department. A T-test and a chi-square test were performed on each survey item in order to determine departmental and gender differences. The comments to the items in the survey and their answers to the interview questions were analyzed using the techniques of naturalistic inquiry described by Lincoln and Guba (1985).

Results

Ten of the survey items were designed to assess the nature of the relationship between the graduate students and their advisors. In addition, two items (11 and 12) tried to determine the level of mentoring in each department (see Table 1). Results indicated that the level of mentoring in both departments was not very high. This view was particularly common among

the female students in chemistry. Only 24.1% of these students agreed that the level of mentoring in their department

Table 1

Students' Relationship with Their Advisor: T-test Results

Statement	Biology Dep. Females	Biology Dep. Males	Chemistry Dep. Females	Chemistry Dep. Males
1. My advisor has equal expectations for his/her male and female students.	3.62	3.60	3.33	3.59
2. I often feel my comments/ideas are taken seriously by my advisor.	3.67	3.84	3.60	3.81
3. My advisor is often available for advice and/or support.	3.59	3.62	3.37*	3.75*
4. I have learned a lot from my advisor.	3.66	3.76	3.70	3.83
5. I feel my advisor has the same expectations for me as for my female colleagues.	3.77	3.57	3.66	3.59
6. I feel my advisor has the same expectations for me as for my male colleagues.	3.62	3.83	3.37*	3.74*
7. My advisor asks for the opinion of hi/her female students even when there are male students around.	3.59	3.61	3.43**	3.83**
8. My advisor asks for the opinion of his/her male students even when there are female students around.	3.84	3.65*	3.87	3.90*
9. My advisor knows how to deal well with his/her male students.	3.28*	3.53	3.67*	3.77
10. My advisor knows how to deal well with his/her female students.	3.15	3.47	3.24	3.52
11. The level of mentoring in my department is very high.	3.32**	3.36	2.69**	3.44**

12. The level of mentoring in my department is inadequate.	2.59**	2.59	3.17**	2.54**

Note. The higher the score is, the stronger the agreement.
*p < .05. **p < .01.

was very high, whereas a much larger percentage of them (48.3%) agreed that the level of mentoring in their department was inadequate. These responses were significantly different from the other three groups (see Items 11 and 12 in Table 1 and Table 2 below). The female students in chemistry were also much less likely to agree that their advisor was often available for support, that he had equal expectations for his male and female students, and that he asked his female students for their opinion (see Items 3, 6, and 7 in Table 1 and Table 2 below). Of the students in the other three groups, between 55.6% and 60.0% of them felt that the level of mentoring in their department was very high (see Item 11 in Table 2).

Various students' comments to items in the survey also alluded to shortcomings in their relationship with their advisors. Females seemed to be particularly affected by the lack of proper mentoring in their department. "If I tell him something, he asks the nearest male for his opinion. I'm never included in their conversations," wrote a female chemistry student. A female biology student who had quit commented: "He was rarely available for advice and was never supportive of our efforts. I found myself avoiding talking to him because it was always a depressing experience."

Although many students talked kindly about their advisors, rarely did students use the term "mentor" in referring to them. The great majority of the students referred to their advisors as "boss." The reason was probably due, at least in part, to the organization of many research projects. When students joined a laboratory, many of them became part of a team that was working on a large project managed by their advisor. The advisor provided financial support to the students and in turn the students performed the work necessary to the success of the advisor's project. As a result, these students had little input in most aspects of their own training and perceived their advisor as their "boss." The following passage from a male student in the biology department reflects this view.

I don't know if you know this, but in sciences like ours and I think in chemistry and physics as well, a lot of times people come into a graduate program, a Ph.D. program specifically, and are given a project by their research advisor. And they rarely, I think, understand why they're doing this project and even less frequently have any real input into what they're going to do. It's sort of a bargain, and the bargain is that you go in, they give you a project to do because, of course, they need to get this research done for their own purposes. You fulfill your part of the bargain by doing this research for three or four years, you get a Ph.D. The person, the advisor,

Table 2

Percentage of Students Agreeing with Each Statement

Statement	Biology Dep. Females	Biology Dep. Males	Chemistry Dep. Females	Chemistry Dep. Males
1. My advisor has equal expectations for his/her male and female students.	76.9	73.3	56.7	72.5
2. I often feel my comments/ideas are taken seriously by my advisor.	76.9	91.1	73.3	86.5
3. My advisor is often available for advice and/or support.	76.9	77.8	63.3	80.0
4. I have learned a lot from my advisor.	73.3	82.2	83.3	86.5
5. I feel my advisor has the same expectations for me as for my female colleagues.	84.6	71.4	75.9	73.5
6. I feel my advisor has the same expectations for me as for my male colleagues.	76.9	85.0	56.7	82.0
7. My advisor asks for the opinion of hi/her female students even when there are male students around.	75.7	72.7	63.3	85.4
8. My advisor asks for the opinion of his/her male students even when there are female students around.	89.2	74.4	86.7	89.6
9. My advisor knows how to deal well with his/her male students.	51.3	72.1	76.7	80.8
10. My advisor knows how to deal well with his/her female students.	46.2	65.1	58.6	60.0
11. The level of mentoring in my department is very high.	56.8	55.6	24.1	60.0

12. The level of mentoring in my department is inadequate.	21.6	15.9	48.3	16.0

will then get a number of papers from that, put their name on them, of course, then be able to secure more grant money to continue another research project to get more people to come in...When during the interviews a male student in chemistry was asked why most students referred to their advisor as a boss, he mentioned another aspect of a boss-employee relationship that he felt was the norm in most laboratories. According to him, in addition to being told what to do, students were monitored periodically on the amount of time they spent in the laboratory as well as the amount of work they accomplished.

> Ya, I think that's pretty accurate [the term "boss"]. I would see my advisor as more of a boss than a mentor. I mean, he certainly is very good about talking with you about your research and giving you advice. But, on the other hand, I feel like periodically I'm expected to prove to him that I'm doing research. And in that sense then, it's much like an employee-boss relationship where you have to prove to your boss that you're worthwhile or else, you know, maybe you won't be around much longer. And so in that way, I think it's fairly true.

Similarly, when asked if she felt her advisor was more like a boss who told her what to do and how to do it, a female in biology replied:

> Absolutely. I guess I worked for him. In fact, it was almost more along the lines of an overseer instead of just a boss. You know, our ideas as students counted almost nothing.

Hackett (1990), contends that the utilitarian approach taken by many advisors is due to the competitive pressures for research money. In addition, the tight research budgets, with little discretionary money, force faculty members to take a more instrumental view of their subordinates, viewing them more as research labor than as students. According to him, today's faculty members must be businesspersons, entrepreneurs, as well as teachers and scholars. This

premise seems to be supported by the comments of a chemistry faculty member who commented that "the job of a faculty member in the sciences is quite entrepreneurial. You can accomplish not only to the level of your intellect, but to your level of gamesmanship."

Indeed, some laboratories look like small entrepreneurial organizations with as many as 25 students. In this type of laboratory most of the advisor's efforts are spent securing funds and in finding efficient ways of running their operation. As productivity becomes the advisor's main concern, the mentoring of students is forgotten and they become replaceable hired hands. According to students, in such laboratories senior students are also responsible for the training of incoming graduate students. The following example was provided by a male student in the chemistry department.

> One group I can think of in particular, students maybe see their advisor, talk with their advisor, every two months, and they have to depend a lot on each other. Especially the newer graduate students usually wind up being paired off with a more advanced graduate student, and they do most of their learning that way.

The Ideal Advisor: Graduate Students' Perspectives

All students interviewed for this study were asked to describe their view of an "ideal" advisor. Most students described their ideal advisor at two levels: personal and professional. On the personal level students felt it was important to find an advisor whose personality and philosophy of life matched one's own and someone who could discuss other topics besides

his/her area of expertise. A male student from the biology department expressed this view particularly well:

> The other things I value a lot are a certain degree of candor and casualness in the relationship. I've known some advisors who are stiff and rigid in dealing with their underlings in the lab, and that's fine early on, but if it never changes, if you work with someone for five years in the same room and they're always kind of stand-offish and are never willing to talk about anything except the details of science that you're working on, that's emotionally not a very welcoming environment. So I'm lucky; my boss likes to talk about politics, about culture, you know, I consider him my friend as well as my scientific advisor. So we have a very relaxed relationship, but yet tense in the sense that in the back of our minds we are both focused on the science. But it's like he feels he can break out from his role as scientific mentor from time to time, and I really appreciate that.

The relationship illustrated here appears to be what Heinrich (1991) calls "colleague-colleague" roles between student and advisor. This type of relationship was identified in a study of graduate students who characterized their advisors as mentors. Heinrich also identified another set of roles assumed by advisors and advisees in mentoring relationships -- "father-daughter/son." The description of the ideal advisor provided by a male biology student illustrates such a relationship:

> Well I think the first thing would be a professor who genuinely cares about the students; that's their primary concern. In other words, I realize that this is a research field, and I am a researcher myself, but if you're not interested in the students, you should not be teaching. He has to have the basic skills of the field, but if he is not interested in the students, then the skills are lost, they won't be transferred. So I think that's a very important feature, deep down, you've got to really be interested in those students, and you've got to be..., it's almost like a father and son or mother and daughter type relationship. You have to have that feeling for them in a level that..., it's got to be more than just a job; it can't be just a job...

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On the professional level, the ideal advisor gives his/her students the proper combination of guidance and autonomy. Guidance so they will not feel completely lost when reaching a dead end in their research, but sufficient autonomy to allow them to try their own creative ideas. Most students felt that guidance was particularly important during the first two years of their graduate work. The following description of the ideal advisor provided by a female student from the biology department echoes this perspective.

> An ideal advisor for me would be one who is encouraging and is supportive and when you bounce off some ideas as you're developing your research is able to help direct your research but not be in control of it. And also someone who is willing to allow a lot of individualism on the part of the student. I think that this is one of the most difficult things for advisors because they do science in a particular way and yet they're working with a lot of different people who may approach science differently. And so being able to sort of direct but also allow the students who have an individual approach to contribute would be my ideal of an advisor.

Providing quality feedback is an important aspect of the communication skills of an ideal advisor. The ideal advisor points out weaknesses and pitfalls in the student's work in order to prevent him/her from getting into situations that may be detrimental to his/her success. Although making mistakes may be a useful aspect of the learning process, mistakes may be costly to students, particularly before they have been accepted to candidacy. A female student in the chemistry department stressed the importance of such communication in the following manner:

> An ideal advisor communicates well with his students. He does not necessarily have to do hands-on work with them in the lab, but is in frequent communication with you on the progress of your work and on your standing with him. I can't emphasize how important the communication aspect is and how it's very important to communicate well and give good feedback, both positive and

> negative, so the students don't all of a sudden get kicked in the butt when it comes down to their candidacy exam or something else important like that, because they've been doing something wrong.

An ideal advisor is empathetic and encourages his or her students. Although students feel that it is important for their advisor to point out their mistakes and weaknesses, they also want someone who after pointing them out encourages the students to go on. The following statement from a biology female student captures well the importance that encouragement plays in a student's perseverance necessary to succeed in graduate school.

> My ideal advisor or mentor would be somebody who is very positive because research can be very frustrating. And if you have somebody who is constantly on you saying, "When is this going to be done or Why didn't that work?" You're going to come down harder on yourself. You have to have somebody who says, "Keep trying, it'll work. Keep going." And to keep you moving in the right direction.

Encouragement and support was also very important to students who were not planning to pursue a career in academia. This was especially important to students who liked science, but were planning to work in industry or as teachers in non-research institutions. These students wanted their advisors to believe in the seriousness of their commitment and work. An ideal advisor would provide affirmation and support to the student's goals, regardless of what they were, instead of dismissing them or considering them trivial. In the words of a female chemistry student, the ideal advisor is "supportive in whatever you decide to do in the future, and considers you a serious scientist even if you don't want to follow through with academia."

An ideal advisor is a good manager. Managerial skills are particularly important when the advisor runs a laboratory with a large number of students. Some students work in laboratories with anywhere from ten to twenty five students. Running such a laboratory probably requires just as much managerial skills as would be required of anyone in charge of a small firm. In addition, because the advisor is the main authority in the laboratory, his/her managerial style sets the tone for the work environment in the laboratory. According to a chemistry female student advisors "set the tone for their laboratory. The way they manage the laboratory is the way the students are going to behave. And if they don't discourage behaviors, then they manifest themselves."

Comparisons Between Reality and Ideal

When asked the extent to which their advisor matched their ideal, students' responses ranged from "very close" to "not at all. However, only one student, a male student from the chemistry department, characterized his past advisor as the "ideal."

> My advisor was excellent. He wasn't overbearing, he never made you 'stay' in the lab for hours on end. He was 'hands off.' He didn't push people; he wanted people to push themselves. He trusted us and respected our ideas. You could go to him any time and talk about things. He tried to teach us more than chemistry. He taught us how to write and how to work the ropes. I respected him and liked him a lot. In my mind my advisor was the "ideal."

The interviewer probed this student's response by asking, "would you consider him a mentor?"

> Sure! Before I left he told me what he thought my strong points were and what he thought my weak points were and gave me good advice about what he thought I could go from there...

The next group of students had advisors who were very close to their ideal. Even though their advisor was not exactly what they would consider the perfect ideal, they felt fortunate being under the supervision of such advisor.

Most students however, had advisors with various degrees of the "ideal" characteristics. Good managerial skills seemed to be a weakness in many advisors. Even students who described their advisors in an affable manner, felt they lacked in good managerial skills. However, these students realized it would be difficult to ever find their "ideal" and were happy that their advisor had most of the ideal traits. The following passage from a male student in the biology department exemplifies this perspective.

> But of course they all can't have everything. You'll have people who have very good managerial skills but they're not very good at getting you motivated on your project. Or people that are very good at getting you motivated on your project but they can't manage the lab. So I think it's rare that you can find someone who can balance everything out.

When asked if his advisor was close to his "ideal" the same student replied:

> Ya, he's very close to that. His downfall is managing people but he has all the other qualities and most of us will take him at that.

Becoming a good manager of people is probably one of the biggest challenges facing any advisor. Students differ in personalities. While some students may prefer advisors who have a "hands-off" approach to the running of their laboratories, other students may prefer advisors who

take more of a "hands-on" approach. The following passage from a faculty member in biology illustrates some of the challenges that advisors face in this area.

> I think the challenge I wasn't prepared for was dealing with people. Because in my area most of us who get an academic career are pretty well trained in the sciences. But as a manager of people, generally of say 20-24 years old, and having to deal with what they expect from you is the most difficult part.

The advisor's ability to be personable with his/her students was another area of weakness reported by some students. Because students were in the last stage of their training for a career in academia or industry, many of them wished their advisors would become more personable with them and treated them more like colleagues. While discussing his advisor, a male biology student commented:

> He is pretty close, except that he's not very approachable. And he's not a very personable guy, he doesn't like to hang around and talk and chat. And although that's not exactly required of him, I think that can also be a good thing. He doesn't really care at all about your personal life or any of that kind of stuff.

One student from the chemistry department felt that perhaps one of the reasons his advisor did not interact very much with his students on a personal level was due to the culture of the department. According to him, professors were discouraged from socializing with their students.

> One thing that I would prefer that he doesn't necessarily have, is that he is very friendly and sociable and we talk about things other than just work, but he doesn't... Some advisors do mix with their students sort of on a social level as well as outside of work, though apparently that's frowned on by most of the professors in the department. When I've gone to meetings with him we go out to

dinner together, we sit around and talk, and that's something that doesn't happen when we're back at the university.

Some students, particularly returning students who were older and who had work experience, resented the lack of collegiality with their advisors. Students wanted to be trusted; they disliked being treated as hourly workers. While discussing this issue a male student from the chemistry department pointed out:

> I think there should be more of a measure of trust than there really is. Because a lot of the students that I know feel like their advisor is always looking over their shoulder or checking up on them to make sure they're working hard and I don't understand that because I would think everybody who is at this level should be mature enough to be able to work on their own.

Perhaps these professors felt that if they were more "soft-handed" their students would not perform to the level they expected of them. However, most students did not believe the more strict approach led to better results. According to them, professors who trusted their students and treated them as responsible adults got as good or better results than the professors who kept a close watch over their students. When asked if she knew a lot of professors who trusted their students a female chemistry student replied:

> Well, there are some. There are at least three people who run their groups like that, and their students are really happy people. They're always talking about their boss in a really positive matter.

When asked if these professors had a higher success rate with their students the same student replied, "most certainly they do! They do retain more people and they attract more too."

The interviewer probed this student's response further by asking, "but isn't there a belief that these students may not be as well qualified after getting their Ph.D. from these professors?"

> No, most of the time everybody knows that they are as qualified as the others. They work as hard as others, they are just happier. There has been a couple of cases where people have gotten their Ph.D. who wouldn't have gotten it in one of the tougher environments. But they are not good representatives of those groups. There's two ways of motivating people, one way is motivating by fear and one way is motivating because they want to do well for their advisor, they admire him.

The nature of the feedback provided by advisors was another area of weakness pointed out by students, particularly chemistry students. According to them, most advisors did not seem to have any difficulty in providing negative feedback when students made mistakes. However, they appeared to have a harder time providing positive feedback. Some advisors seemed to forget that students also needed a "pat in the back" once in a while. The following account from a male chemistry student illustrates this problem.

> In six years that I've been here, I've been told I was doing a good job once. And that was this year. So I went for six years without it. It's definitely a big hit on your morale, you know, when you are working hard you expect..., I mean, you definitely need to be recognized for that; to keep encouraging you to keep doing it. There have been times when, for a month straight, I haven't left the chemistry building much except for a few hours of sleep a night and to go eat. And when you are not told, you know, 'that's great!; good job!,' there's no incentive to do that anymore, although ultimately that's what you need to do to be successful in this department.

To some students the constant negative feedback was demoralizing as they noticed their self-confidence erode quickly away, as the following passage from a chemistry female student illustrates.

> I really can't deal with always having negative feedback. If you concentrate on a person's weak points then you find those, but you never know what your strengths are and then you start questioning, 'do I have any strengths? Am I really good at anything?

Positive feedback might be particularly important to incoming students who need to be affirmed about their capabilities to succeed and to students, especially females, who may be a little more sensitive to negative feedback. Students need positive feedback first as a source of encouragement and energy to keep going, and second as an indication of the students' standing in their advisor's judgment of their capabilities. According to Lunneborg (1982), students look to their advisors for perceptions of aspirations they have for them.

There were also a number of students who did not have very positive opinions of their advisors. They felt that their advisors used favoritism and did not treat all students in an equitable manner. Other students felt their advisors used a Social Darwinistic approach to the running of their laboratory. The following comments from a female student in the chemistry department illustrates this approach.

> My advisor takes the approach..., he gives you enough rope to hang yourself. And if you're taking a wrong course, he's not going to stop you, which to a certain extent is a learning experience, but after a while it becomes a little dangerous. He has used the term 'survival of the fittest,' and that's how he believes his lab

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> should be run. That's how he believes the department should be run; survival of the fittest...

Another female student in chemistry shared the same view.

> I thought our group would work more as a team, and I thought professors would help you like a "leader" would. I think my professor runs his groups so that we compete against each other. I'm competitive and I can compete against other people, but it's not really the type of atmosphere that I was interested in.

Unfortunately these experiences where not unique in the chemistry department where the female attrition rate averaged almost 50%. In addition, the five female students interviewed for this study who had quit, attributed their leaving to the poor relationship they had with their advisor.

The ability to show interest and concern for all students may require that advisors tailor their mentoring differently from student to student. Incoming students have different needs. Some students may enter graduate school with more research experience than others. In addition, some students may be very independent and require less guidance whereas others may be more insecure and need periodic affirmation from their advisors. In laboratories where female students are a small minority, advisors need to show genuine interest in their work and make an effort to help them feel welcome.

In a study of women doctoral recipients, Heinrich (1991), identified three approaches used by male advisors in their advising of female students: (1) traditionally masculine, (2) traditionally feminine, and (3) androgynous. Advisors who used a traditionally masculine

approach to advisement were task-oriented and handled conflict with their advisees by direct confrontation. On the other hand, advisors who used a traditionally feminine approach to advisement, overly emphasized the interpersonal dimension and avoided conflict with women advisees at all costs. However, advisors with an androgynous approach to advisement were gender-sensitive mentors. Instead of using gender role stereotypes mentioned in the two previous approaches, these advisors tailored their mentoring to the needs of their individual students by using a combination of masculine and feminine principles. These advisors combined "task- and goal-oriented" approaches while attending to the interpersonal dimension of the relationship with their advisees.

Conclusion

Although some students used more complex descriptions in their characterization of the ideal advisor, a number of characteristics were common across most descriptions. Students wanted an advisor who while providing the necessary help and expertise, would also give them the opportunity to try their own ideas. Students wanted advisors who were approachable, and who could relate to students outside the realm of the discipline. They also wanted advisors who were empathetic of their needs and difficulties. The ideal advisor trusted and respected his/her students while treating each one as an individual. Lastly, the ideal advisor used good managerial skills in the running of his/her laboratory. A female biology student's

characterization of the ideal advisor provides perhaps the best illustration of all the attributes that students felt were part of an ideal advisor.

> It's someone who, rather than trying to dominate a student, provides the student with a language and a framework so the student can sort of follow the interests that he/she has already instinctively chosen. It's someone who is critical in the positive sense of the word. It's someone who is engaged in your work at an intellectual level regardless of how far removed it may seem to his/her own interests. It's someone who wants you to succeed and recognizes that your success is an extension of his/her success. And it's someone who is flexible and comfortable with the different rates at which different students make progress. Someone who can say, 'well this student may need from me to be like this so I may need to change my advisement style just a little bit with this particular student.' Rather than having what they think is a formula that works well for all students. It's someone who appreciates that graduate school is tough and it requires a lot of personal sacrifice and someone who is sensitive to that as well. That we've all make a lot of personal sacrifices to be here. And it's not someone that's necessarily going to agree with you a hundred percent of the time, but that's all right. It never concerned me that I was going to be disagreed with from time to time... Someone who is just involved and not absent... I guess that's what I would say my perfect advisor is.

Although some students felt their advisor was very close to their ideal, the majority of them pointed out various shortcomings in their advisor's advising/mentoring approach. Students were aware that it would be almost impossible for an advisor to be a good mentor to all students, particularly those who had a large number of them. However, students' comments indicated that some advisors did not use a mentoring approach in the interactions with their students. In fact, some students appeared to have very few interactions with their advisors. They were periodically obliged to turn in to their advisor reports to account for their work and the number of hours spent in the laboratory.

Students joined their program expecting to find in their advisor a mentor who would guide and support them as they progressed through their socialization into a career in science. However, results indicated that a relatively small percentage of students felt the level of mentoring in their department was very high. The perception of the lack of mentoring was particularly prevalent among the female students in the Chemistry Department.

References

Anderson, E., & Shannon, A. (1988). Toward a conceptualization of mentoring. Journal of Teacher Education, 39(1), 38-42.

Bargar, R. R., & Mayo-Chamberlain, J. (1983). Advisor and advisee issues in doctoral education. Journal of Higher Education, 54(4), 407-432.

Brown, J., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. Educational Researcher, 18, 32-42.

Carter, F. J. (1983). Quality of life, adjustments and stress among graduate students. Unpublished doctoral dissertation, Vanderbilt University, Nashville.

Daniels-Nelson, M. E. (1983). Doctoral candidates and graduates' perceptions of advisor-advisee relationships in selected areas of education. Unpublished doctoral dissertation, Ohio State University, Columbus.

Hackett, E. J. (1990). Science as a vocation in the 1990s. Journal of Higher Education, 61(3), 241-279.

Heinrich, K. T. (1991). Loving partnerships: Dealing with sexual attraction and power in doctoral advisement relationships. Journal of Higher Education, 62(5), 515-538.

Lincoln, Y. S., & Guba, E. (1985). Naturalistic inquiry. Beverly Hills, CA: Sage Publications.

Lunneborg, P. W. (1982). Role model influences of nontraditional professional women. Journal of Vocational Behavior, 20(3), 276-281.

Randall, W. C. (1982). Responsibilities of the mentor to his Ph.D. student in physiology. Psychologist, 25(3), 124-126).

Sorenson, G., & Kagan, D. (1967). Conflicts between doctoral candidates and their sponsors: A contrast in expectations. Journal of Higher Education, 38, 17-24.

Subotnik, R. F., & Arnold, K. D. (1995). Passing through the gates: Career establishment of talented women scientists. Roeper Review, 18(1), 55-61.

Windnall, S. E. (1988). AAAS presidential lecture: Voices from the pipeline. Science, 241, 1740-1745.

Winston, R., Miller, T., Ender, S., & Grites, T. (1984). Developmental academic advising. Jossey-Bass: San Francisco.